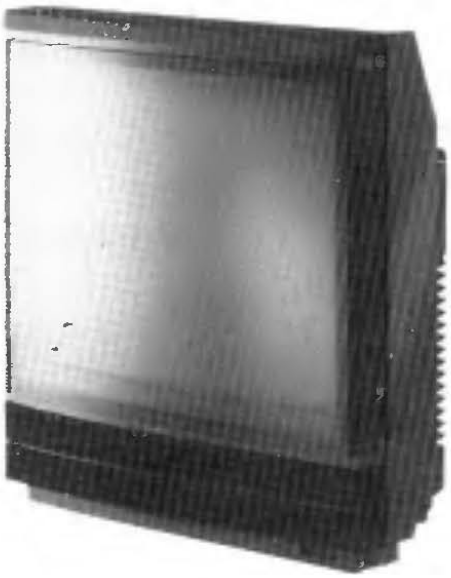
Bang&Olufsen



Beovision MX 7000

Type 338X/3390

SERVICE MANUAL

10-92 3538821 Paste into Service Manual Beovision LX 5000/6000, MX 4000/6000, 3538812

8-3
TYPE SURVEY

***TYPE SURVEY**

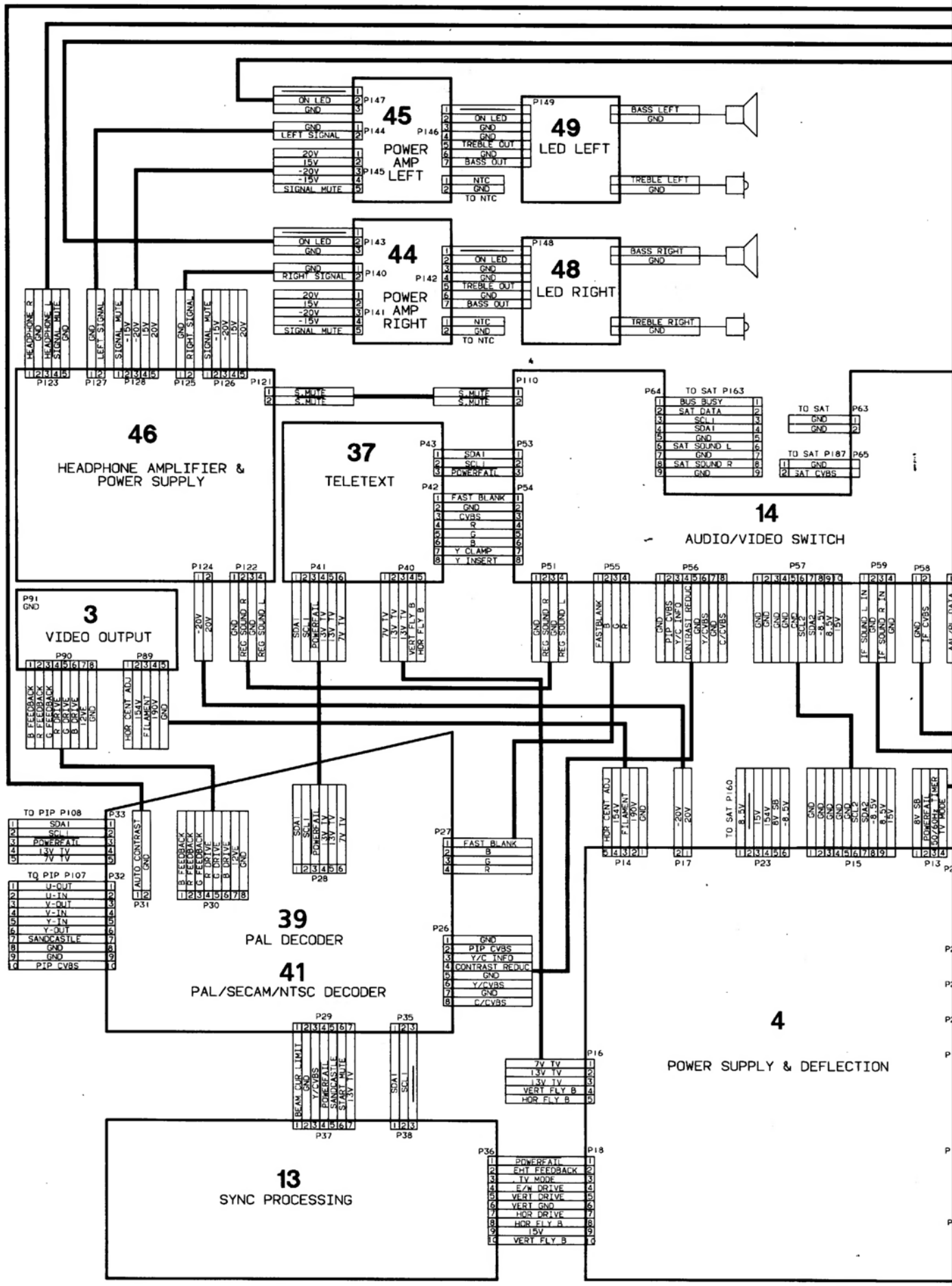
MX7000	System	Colour	Stereo	Remarks	
3380	B/G/L[1)]	PAL/SECAM	A2		EU
3381	B/G/L[1)]	PAL/SECAM	A2+NICAM		EU
3383	I	PAL	NICAM		GB
3384	B/G/L[1)]	PAL/SECAM	A2		Italy
3385	B/G/L[1)]	PAL	A2		AUS
3386	B/G/L[1)]	PAL/SECAM	A2	SAT	EU
3387	B/G/L[1)]	PAL/SECAM	A2+NICAM	SAT	EU
3388	B/G/L[1)]	PAL/SECAM	A2+NICAM	SAT D2 MAC	EU
3389	I	PAL	NICAM	SAT	GB
3390	I	PAL	NICAM	SAT D2 MAC	GB
3392	B/G/L[1)]	PAL/SECAM	A2	SAT	Italy

[1)]System L: To receive VHF band 1 system L, the TV has to be fitted with a transposer part no. 1306125 (white) 1306126 (black).

8007449 Tuner & IF system B/G/L PCB.
3390452 Small bag with components to extend 8007449 to system I.
3390453 Small bag with components to modify 8007449 to system B/G/D/K.
8008062 PAL/SECAM/NTSC colour decoder PCB. TV's equiped with 8008062 (PAL/SECAM MODELS) are able to receive NTSC on AV.
8007997 Tuner & IF system B/G/M PCB.

Mounting modules for modification to other TV transmission systems				
PAL B/G/I	**PAL/SECAM B/G/L/I[1)]**	**PAL/SECAM B/G/D/K**	**PAL/SECAM B/G/L[1)]**	**PAL/SECAM B/G NTSC M**
	3390452	3390453		8007997
	3390452	3390453		8007997
3390452 +8007449	3390452 +8007449 +8008062	3390453 +8007449 +8008062	8007449 +8008062	8007997 +8008062
	3390452	3390453		8007997
3390452 +8007449	3390452 +8007449 +8008062	3390453 +8007449 +8008062	8007449 +8008062	8007997 +8008062
	3390452	3390453		8007997
	3390452	3390453		8007997
	3390452	3390453		8007997
3390452 +8007449	3390452 +8007449 +8008062	3390453 +8007449 +8008062	8007449 +8008062	8007997 +8008062
3390452 +8007449	3390452 +8007449 +8008062	3390453 +8007449 +8008062	8007449 +8008062	8007997 +8008062
	3390452	3390453		8007997

WIRING DIAGRAM



9-1
WIRING DIAGRAM

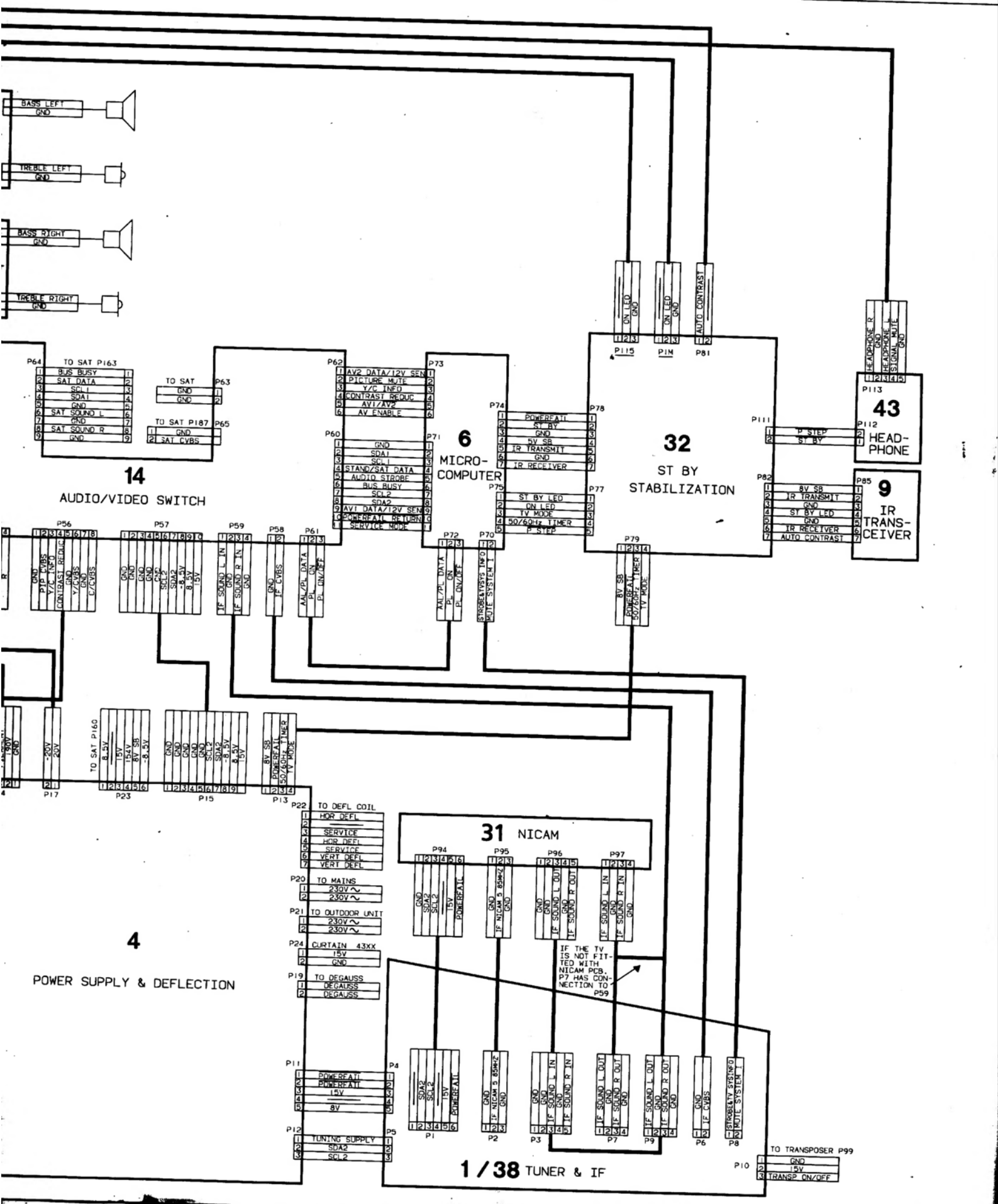
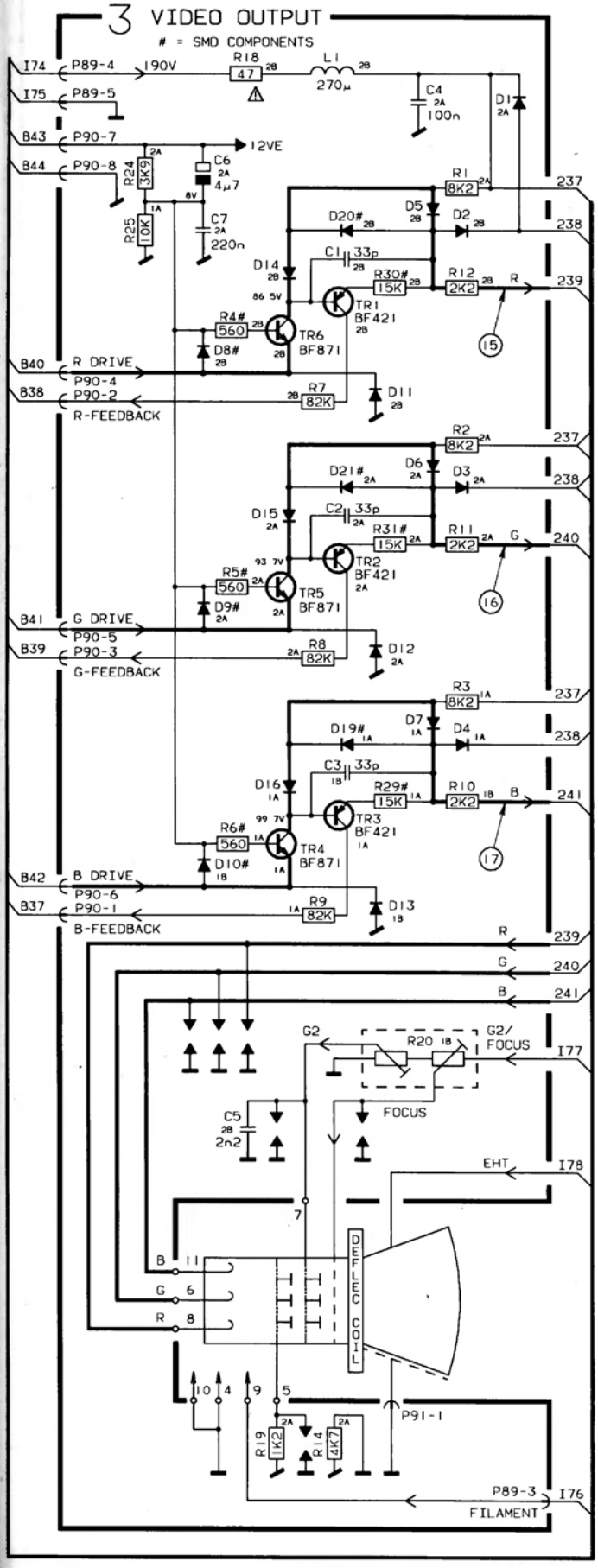


DIAGRAM C VIDEO OUTPUT



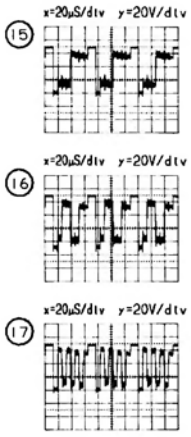
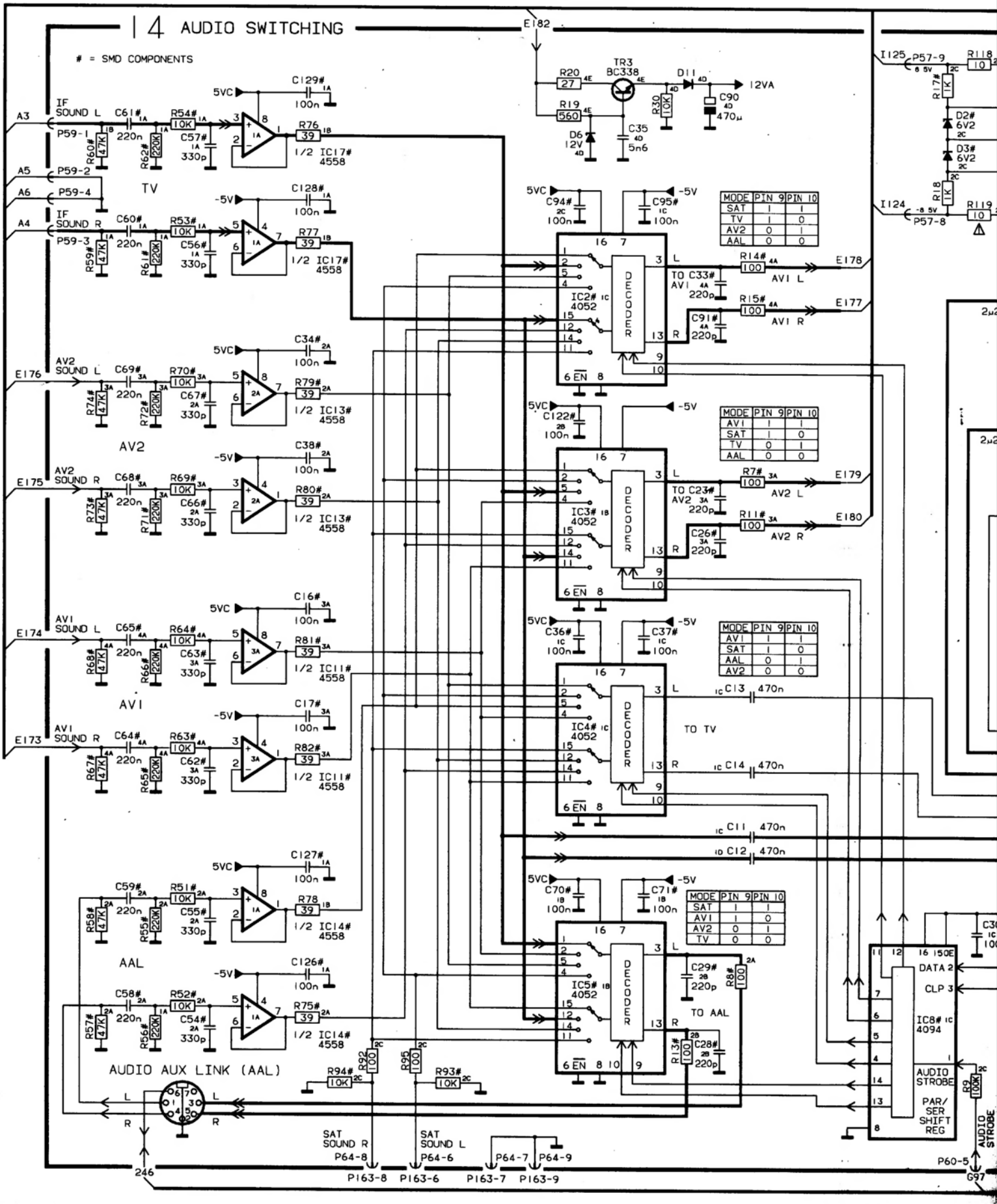
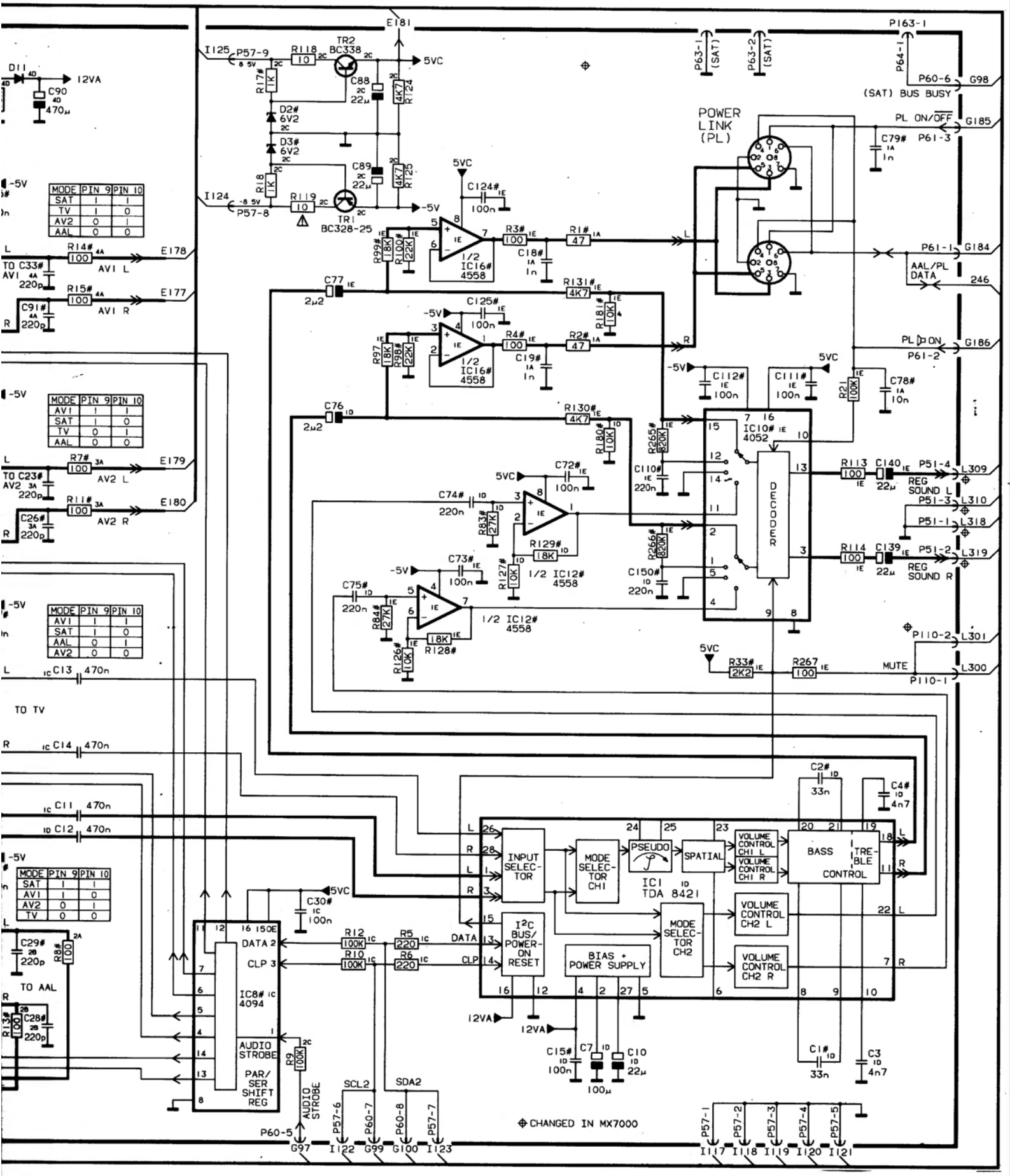


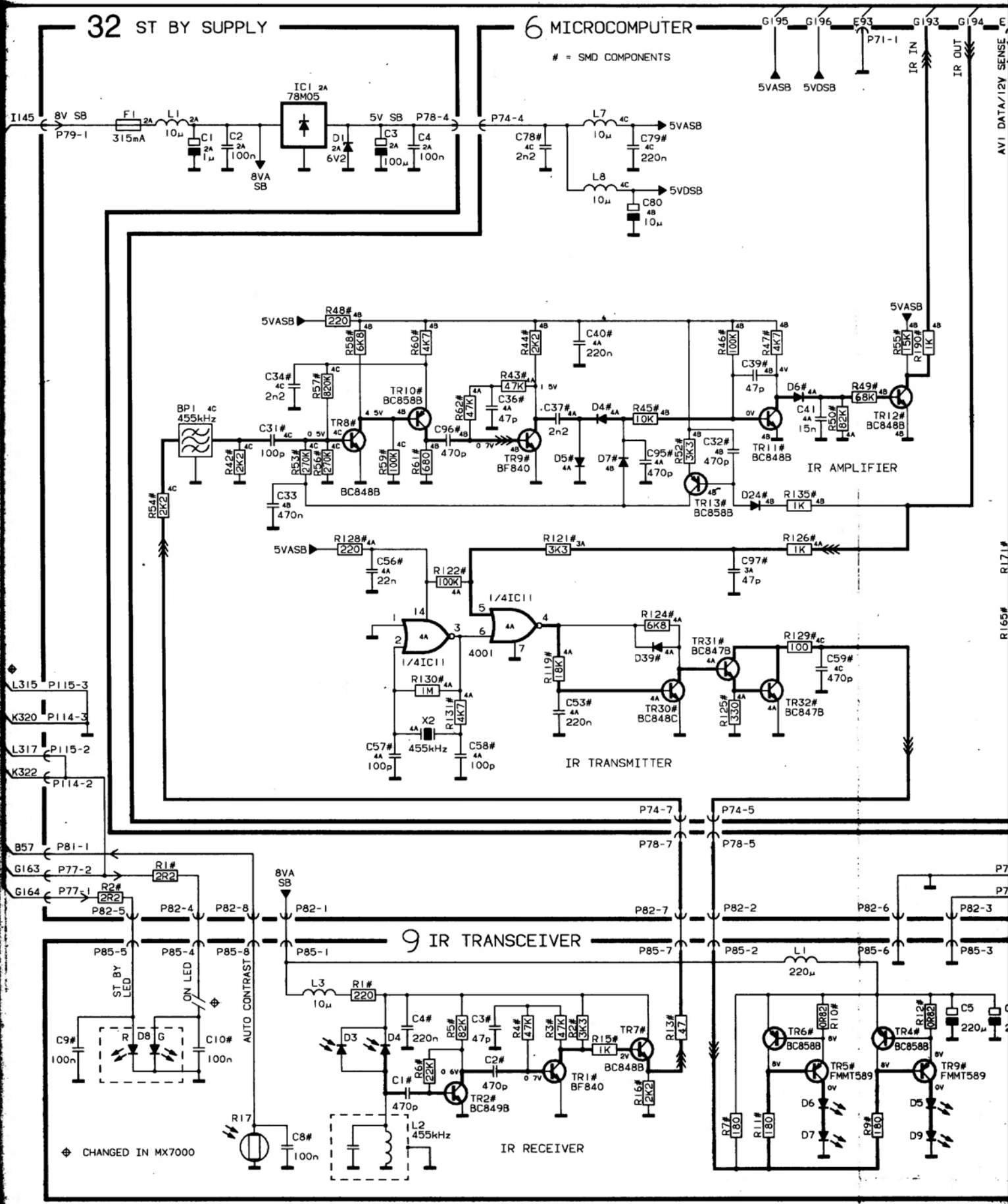
DIAGRAM D SOUND SWITCHING & CONTROL



9-3
DIAGRAM D


E181
P163-1
P63-1 (SAT)
P63-2 (SAT)
P64-1
P60-6 G98
(SAT) BUS BUSY
POWER LINK (PL)
PL ON/OFF G185
P61-3
P61-1 G184
AAL/PL DATA
246
PL ON G186
P61-2
D11
12VA
C90 470µ
5VC
TR2 BC338
TR1 BC328-25
I125 P57-9
I124 P57-8
R118 10
R119 10
R17# 1K
R18 1K
D2# 6V2
D3# 6V2
C88 22µ
C89 22µ
4K7 R124
4K7 R125
C124# 100n
-5V
R99# 18K
R100# 22K
R97 18K
R98# 22K
1/2 IC16# 4558
R3# 100
R4# 100
R1# 47
R2# 47
C18# 1n
C19# 1n
C125# 100n
C77 2µ2
R131# 4K7
R181# 10K
C76 2µ2
R130# 4K7
R180# 10K
C112# 100n
C111# 100n
C78# 10n
R21 100K
IC10# 4052
R265# 820K
R266# 820K
C110# 220n
C150# 220n
C72# 100n
C74# 220n
R83# 27K
R129# 18K
R127# 10K
1/2 IC12# 4558
C73# 100n
C75# 220n
R84# 27K
R128# 18K
R126# 10K
R113 100
C140 22µ
REG SOUND L
R114 100
C139 22µ
REG SOUND R
P51-4 L309
P51-3 L310
P51-1 L318
P51-2 L319
P110-2 L301
P110-1 L300
MUTE
R33# 2K2
R267 100
MODE | PIN 9 | PIN 10
SAT | 1 | 1
TV | 1 | 0
AV2 | 0 | 1
AAL | 0 | 0
R14# 100
R15# 100
AV1 L
AV1 R
E178
E177
TO C33# AV1 220p
C91# 220p
MODE | PIN 9 | PIN 10
AV1 | 1 | 1
SAT | 1 | 0
TV | 0 | 1
AAL | 0 | 0
R7# 100
R11# 100
AV2 L
AV2 R
E179
E180
TO C23# AV2 220p
C26# 220p
MODE | PIN 9 | PIN 10
AV1 | 1 | 1
SAT | 1 | 0
AAL | 0 | 1
AV2 | 0 | 0
C13 470n
TO TV
C14 470n
C11 470n
C12 470n
MODE | PIN 9 | PIN 10
SAT | 1 | 1
AV1 | 1 | 0
AV2 | 0 | 1
TV | 0 | 0
C29# 220p
R8# 100
TO AAL
C28# 220p
R13# 100
C30# 100n
IC8# 4094
DATA 2
CLP 3
AUDIO STROBE
PAR/ SER SHIFT REG
R12 100K
R10 100K
R5 220
R6 220
DATA
CLP
R9 100K
AUDIO STROBE
SCL2
SDA2
P60-5 G97
P57-6 I122
P60-7 G99
P60-8 G100
P57-7 I123
INPUT SELECTOR
MODE SELECTOR CH1
PSEUDO
SPATIAL
VOLUME CONTROL CH1 L
VOLUME CONTROL CH1 R
BASS
TREBLE
CONTROL
IC1 TDA 8421
I²C BUS/ POWER-ON RESET
BIAS + POWER SUPPLY
MODE SELECTOR CH2
VOLUME CONTROL CH2 L
VOLUME CONTROL CH2 R
C2# 33n
C4# 4n7
C1# 33n
C3 4n7
C15# 100n
C7 100µ
C10 22µ
12VA
CHANGED IN MX7000
P57-1 I117
P57-2 I118
P57-3 I119
P57-4 I120
P57-5 I121

AGRAM F IR TRANSCEIVER AND 5V ST BY SUPPLY



9-4
DIAGRAM F

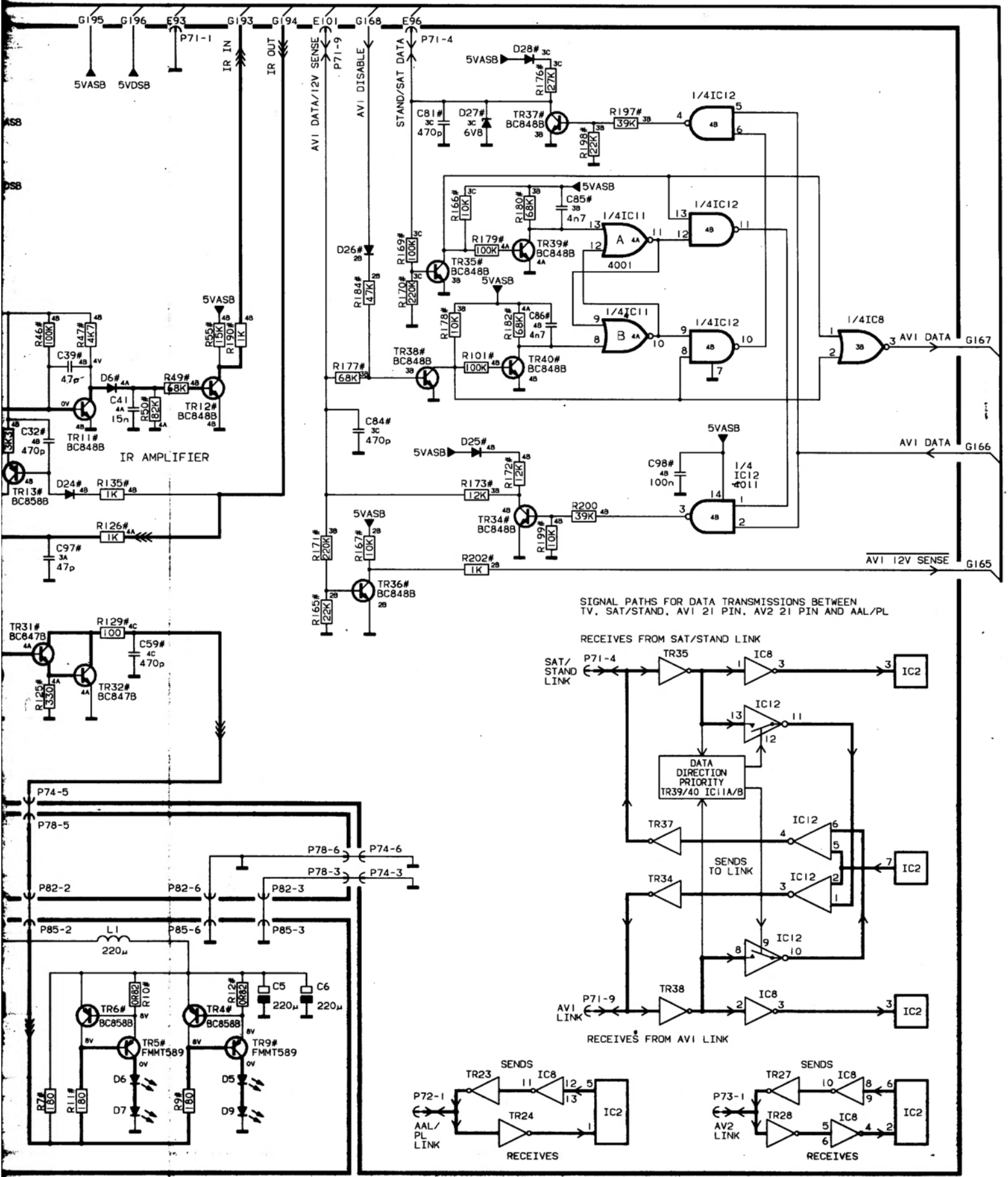
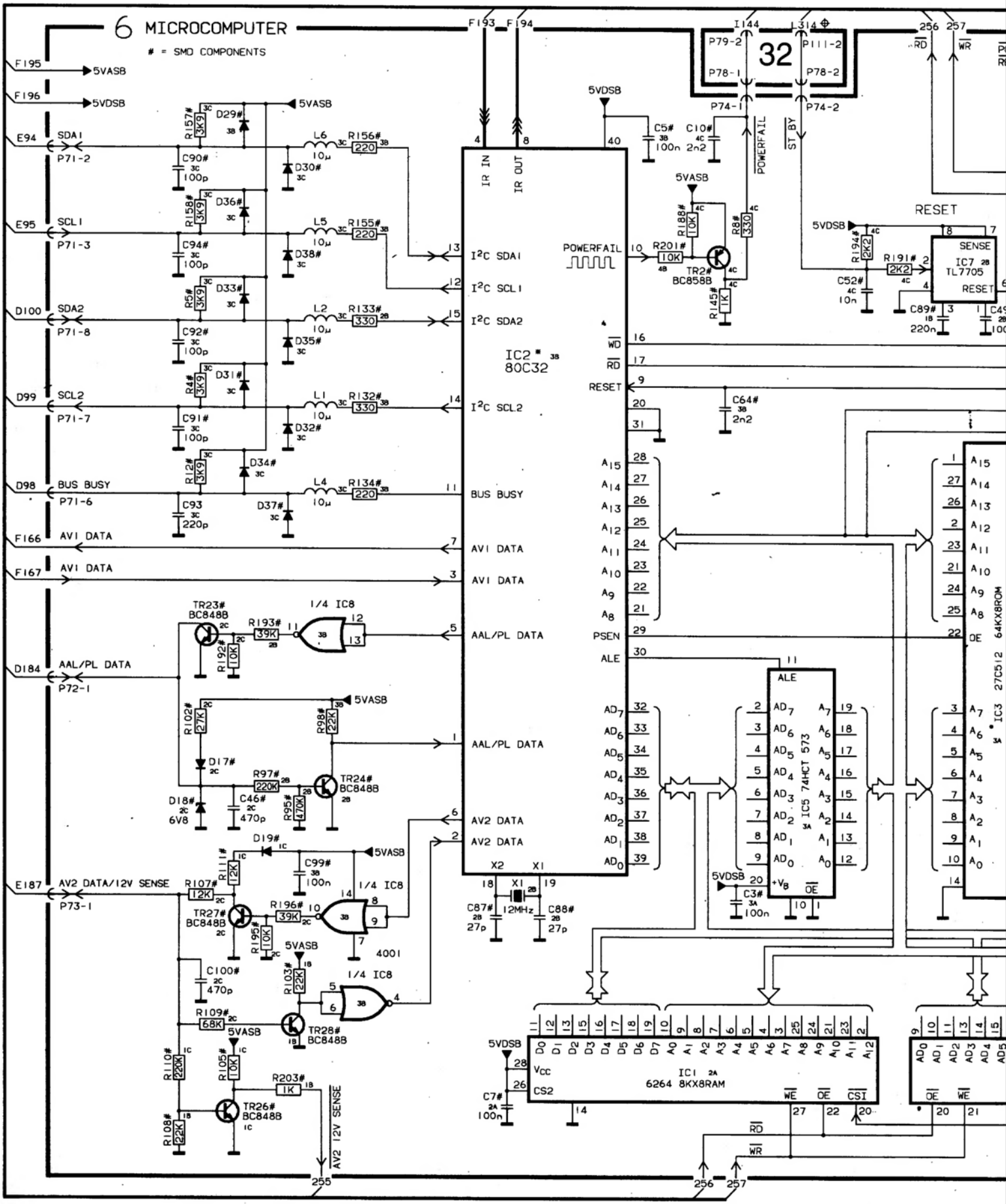

G195
G196
E93
P71-1
G193
G194
E101
G168
E96
5VASB
5VDSB
IR IN
IR OUT
AVI DATA/12V SENSE
P71-9
AVI DISABLE
STAND/SAT DATA
P71-4
D28#
R176#
27K
C81#
470p
D27#
6V8
TR37#
BC848B
R197#
39K
R198#
22K
1/4IC12
R166#
10K
R180#
68K
C85#
4n7
1/4IC11
R179#
100K
TR39#
BC848B
4001
R169#
100K
TR35#
BC848B
D26#
R184#
47K
R170#
220K
R178#
10K
R182#
68K
C86#
4n7
TR38#
BC848B
R101#
100K
TR40#
BC848B
R177#
68K
1/4IC8
AVI DATA
G167
AVI DATA
G166
AVI 12V SENSE
G165
R46#
100K
R47#
4K7
C39#
47p
D6#
R49#
68K
C41
15n
R50#
82K
TR12#
BC848B
R55#
15K
R190#
1K
TR11#
BC848B
IR AMPLIFIER
C32#
470p
TR13#
BC858B
D24#
R135#
1K
R126#
1K
C97#
47p
C84#
470p
D25#
R172#
12K
R173#
12K
TR34#
BC848B
R200
39K
R199#
10K
C98#
100n
1/4
IC12
4011
R171#
220K
R167#
10K
R202#
1K
TR36#
BC848B
R165#
22K
TR31#
BC847B
R129#
100
C59#
470p
TR32#
BC847B
R125#
330
P74-5
P78-5
P78-6
P74-6
P78-3
P74-3
P82-2
P82-6
P82-3
P85-2
L1
220µ
P85-6
P85-3
TR6#
BC858B
R10#
0R82
TR4#
BC858B
R12#
0R82
C5
220µ
C6
220µ
TR5#
FMMT589
TR9#
FMMT589
D6
D7
D5
D9
R7#
180
R11#
180
R9#
180
SIGNAL PATHS FOR DATA TRANSMISSIONS BETWEEN
TV, SAT/STAND, AVI 21 PIN, AV2 21 PIN AND AAL/PL
RECEIVES FROM SAT/STAND LINK
SAT/
STAND
LINK
P71-4
TR35
IC8
IC2
IC12
DATA
DIRECTION
PRIORITY
TR39/40 IC11A/B
TR37
SENDS
TO LINK
TR34
TR38
AVI
LINK
P71-9
RECEIVES FROM AVI LINK
SENDS
TR23
P72-1
AAL/
PL
LINK
TR24
RECEIVES
SENDS
TR27
P73-1
AV2
LINK
TR28
RECEIVES

DIAGRAM G MICROCOMPUTER



9-5
DIAGRAM G

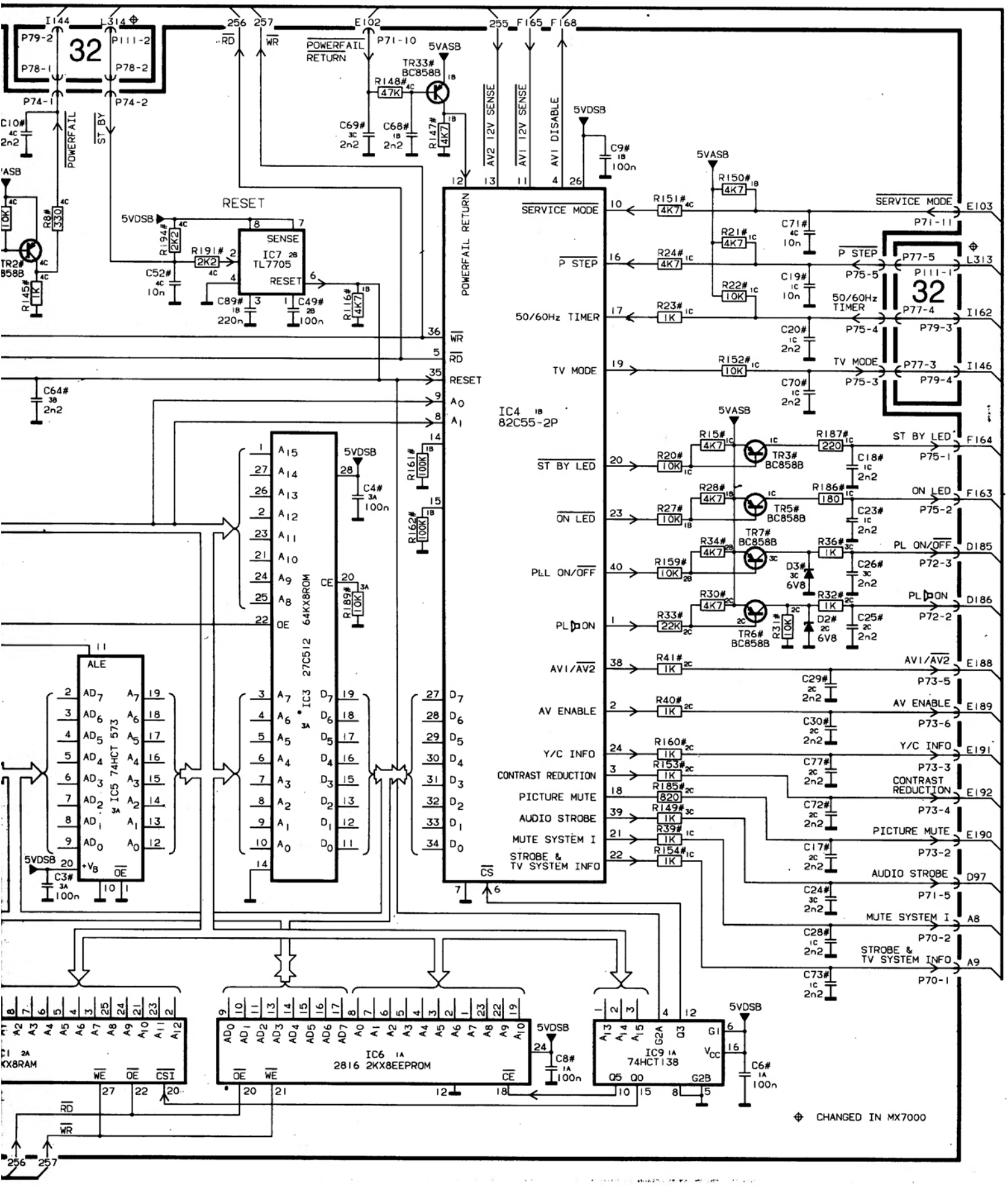
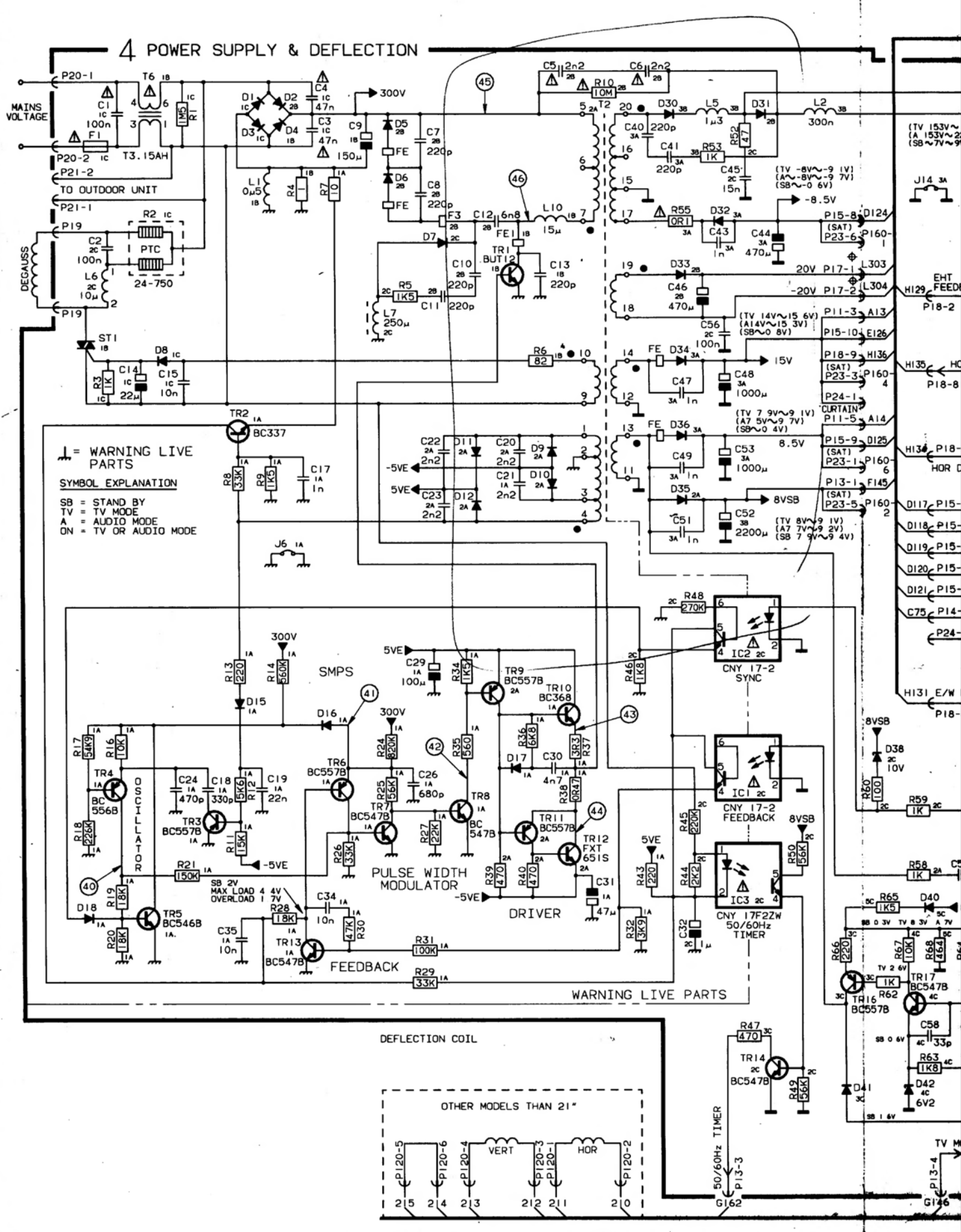

I144
I314
P79-2
P78-1
P74-1
32
P111-2
P78-2
P74-2
256
257
E102
255
F165
F168
RD
WR
POWERFAIL RETURN
P71-10
5VASB
TR33# BC858B
R148# 47K
C69# 2n2
C68# 2n2
R147# 4K7
AV2 12V SENSE
AV1 12V SENSE
AV1 DISABLE
5VDSB
C9# 100n
POWERFAIL
ST BY
RESET
R194# 2K2
R191# 2K2
SENSE
IC7 TL7705
RESET
C52# 10n
C89# 220n
C49# 100n
R116# 4K7
C64# 2n2
IC4 82C55-2P
POWERFAIL RETURN
SERVICE MODE
P STEP
50/60Hz TIMER
TV MODE
RESET
A0
A1
WR
RD
CS
ST BY LED
ON LED
PLL ON/OFF
PL ON
AV1/AV2
AV ENABLE
Y/C INFO
CONTRAST REDUCTION
PICTURE MUTE
AUDIO STROBE
MUTE SYSTEM I
STROBE & TV SYSTEM INFO
R150# 4K7
R151# 4K7
R21# 4K7
R24# 4K7
R22# 10K
R23# 1K
R152# 10K
C71# 10n
C19# 10n
C20# 2n2
C70# 2n2
SERVICE MODE
E103
P71-11
P77-5
P75-5
L313
P111-1
32
50/60Hz TIMER
P77-4
P75-4
I162
P79-3
TV MODE
P77-3
P75-3
I146
P79-4
R15# 4K7
R20# 10K
R28# 4K7
R27# 10K
R34# 4K7
R159# 10K
R30# 4K7
R33# 22K
TR3# BC858B
TR5# BC858B
TR7# BC858B
TR6# BC858B
R187# 220
R186# 180
R36# 1K
R32# 1K
R31# 10K
D3# 6V8
D2# 6V8
C18# 2n2
C23# 2n2
C26# 2n2
C25# 2n2
ST BY LED
F164
P75-1
ON LED
F163
P75-2
PL ON/OFF
D185
P72-3
PL ON
D186
P72-2
R41# 1K
R40# 1K
R160# 1K
R153# 1K
R185# 820
R149# 1K
R39# 1K
R154# 1K
C29# 2n2
C30# 2n2
C77# 2n2
C72# 2n2
C17# 2n2
C24# 2n2
C28# 2n2
C73# 2n2
AV1/AV2
E188
P73-5
AV ENABLE
E189
P73-6
Y/C INFO
E191
P73-3
CONTRAST REDUCTION
E192
P73-4
PICTURE MUTE
E190
P73-2
AUDIO STROBE
D97
P71-5
MUTE SYSTEM I
A8
P70-2
STROBE & TV SYSTEM INFO
A9
P70-1
R161# 100K
R162# 100K
R189# 10K
C4# 100n
IC3 27C512 64KX8ROM
IC5 74HCT 573
ALE
C3# 100n
IC6 2816 2KX8EEPROM
C8# 100n
IC9 74HCT138
C6# 100n
CHANGED IN MX7000

DIAGRAM I POWER SUPPLY & DEFLECTION



9-6
DIAGRAM I

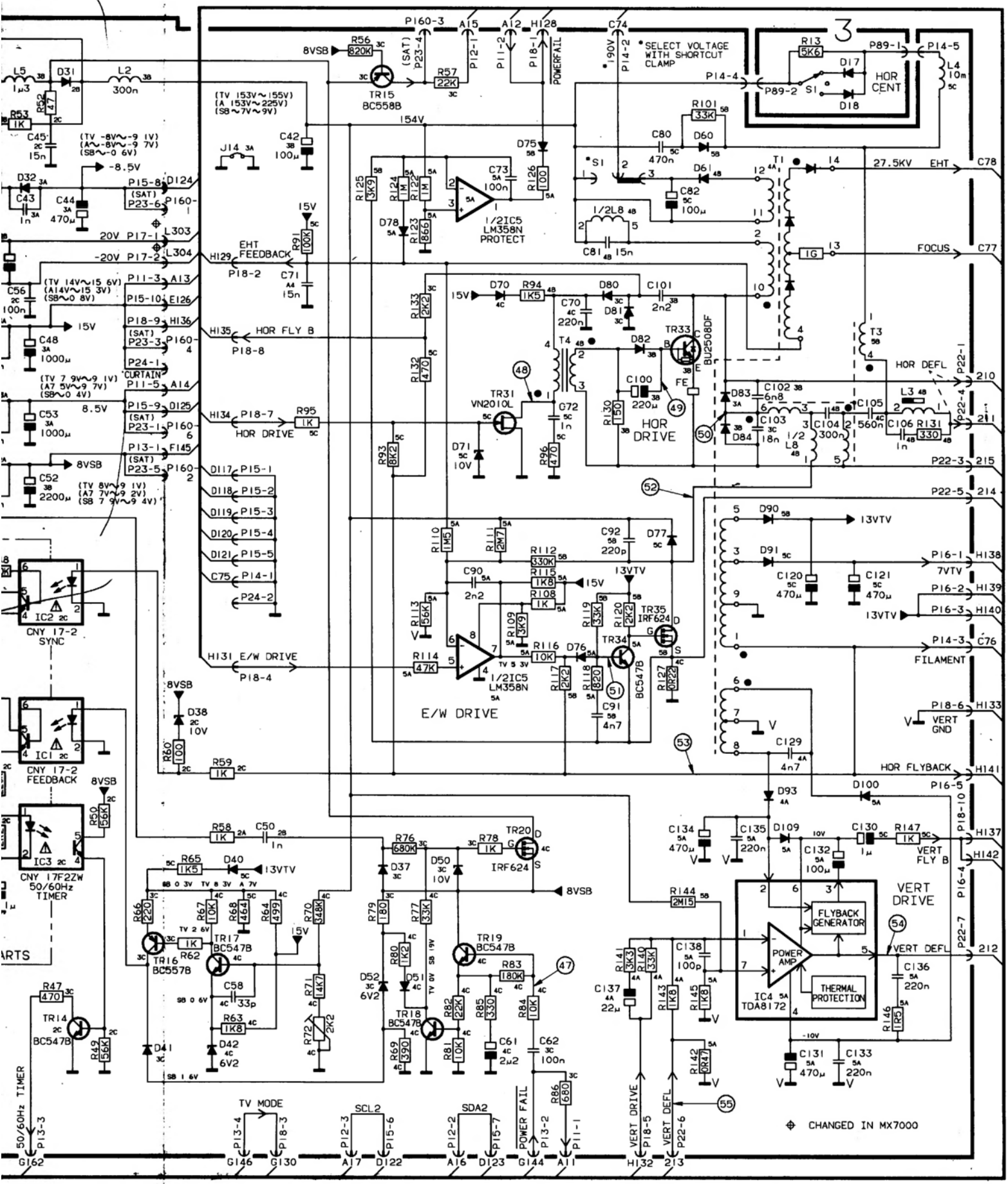
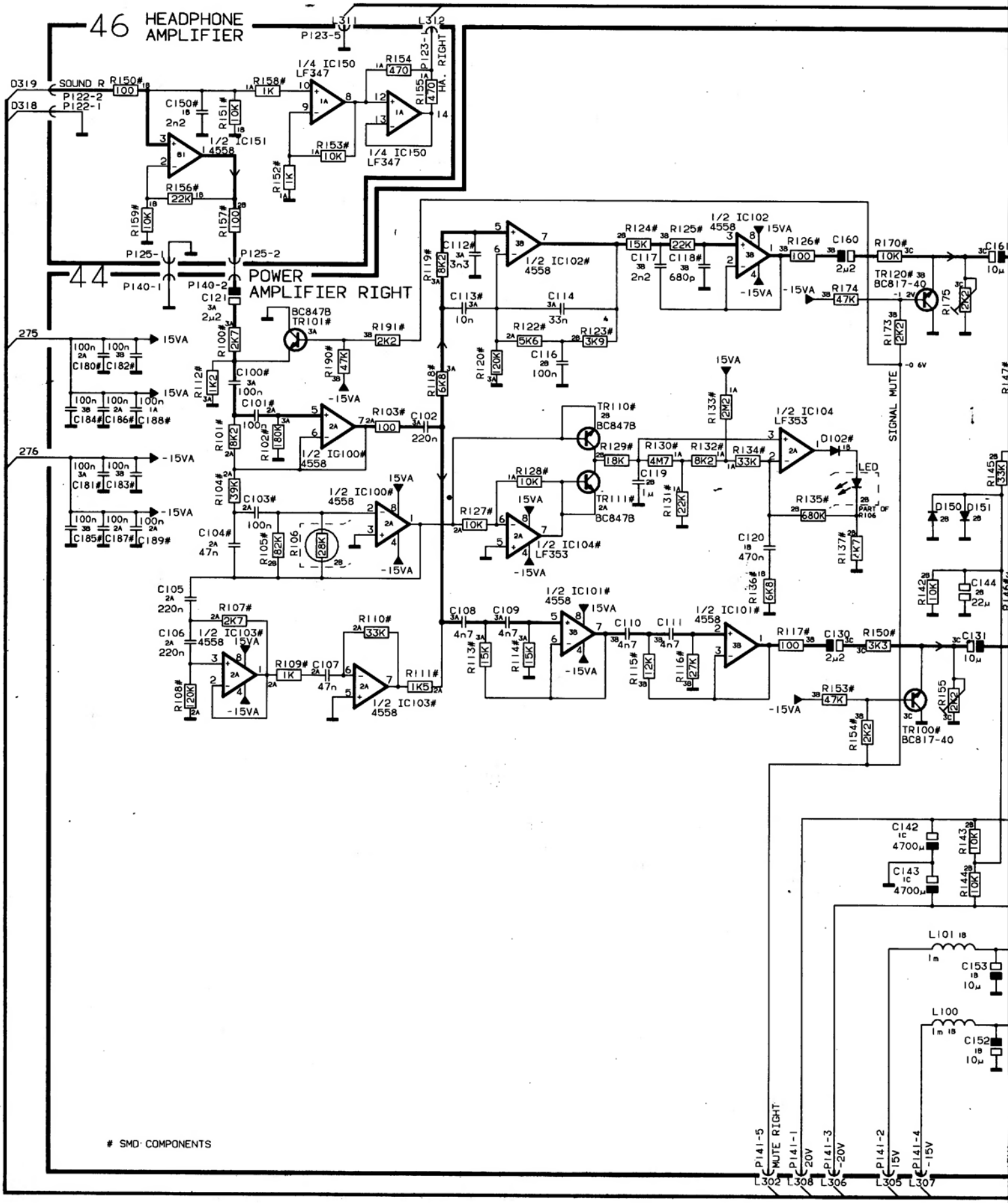
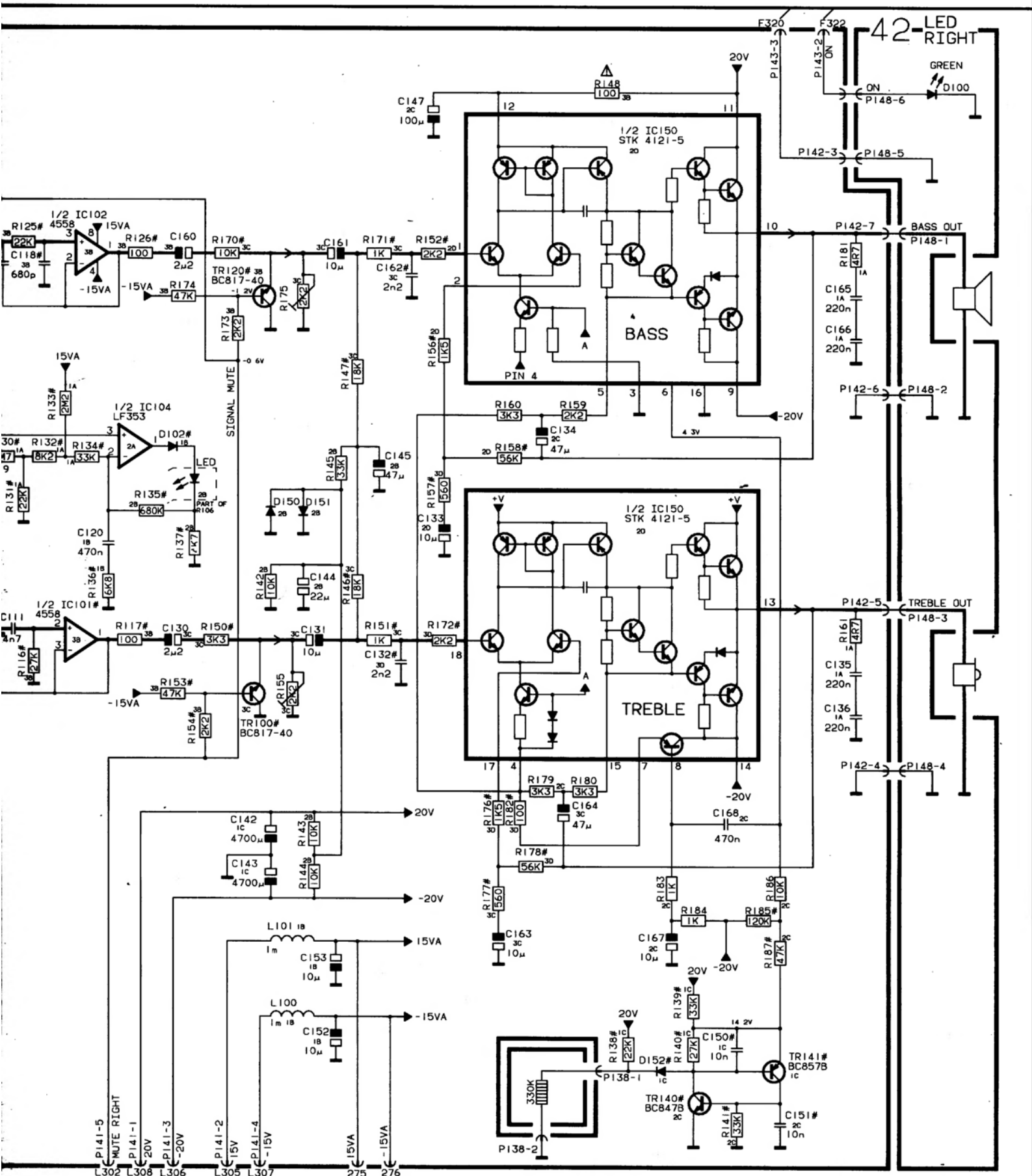

8VSB
R56 820K
TR15 BC558B
(SAT) P23-4
R57 22K
P160-3
A15
A12
H128
C74
POWERFAIL
190V
P14-2
*SELECT VOLTAGE WITH SHORTCUT CLAMP
R13 5K6
D17
HOR CENT
D18
P89-1
P89-2
S1
P14-5
P14-4
L4 10m
R101 33K
C80 470n
D60
D61
C82 100µ
T1
27.5KV EHT
C78
FOCUS
C77
1/2L8
C81 15n
154V
D75
C73 100n
R125 3K9
R124 1M
R122 1M
R126 100
1/2IC5 LM358N PROTECT
D78
R123 866
15V
R91 100K
EHT FEEDBACK
H129
P18-2
C71 15n
20V P17-1
L303
-20V P17-2
L304
(TV 153V~155V)
(A 153V~225V)
(S8~7V~9V)
J14
C42 100µ
(TV -8V~-9 1V)
(A~-8V~-9 7V)
(S8~-0 6V)
-8.5V
D32
C43 1n
C44 470µ
P15-8 D124
(SAT) P23-6 P160-1
L5 1µ3
D31
L2 300n
R52 47
R53 1K
C45 15n
(TV 14V~15 6V)
(A14V~15 3V)
(S8~0 8V)
P11-3 A13
P15-10 E126
C56 100n
15V
C48 1000µ
P18-9 H136
(SAT) P23-3 P160-4
P24-1 CURTAIN
(TV 7 9V~9 1V)
(A7 5V~9 7V)
(S8~0 4V)
P11-5 A14
8.5V
C53 1000µ
P15-9 D125
(SAT) P23-1 P160-6
8VSB
C52 2200µ
(TV 8V~9 1V)
(A7 7V~9 2V)
(S8 7 9V~9 4V)
P13-1 F145
(SAT) P23-5 P160-2
D117 P15-1
D118 P15-2
D119 P15-3
D120 P15-4
D121 P15-5
C75 P14-1
P24-2
HOR FLY B
H135
P18-8
R95 1K
HOR DRIVE
H134
P18-7
D70 R94 1K5
D80
C101 2n2
C70 220n
D81
R133 2K2
R132 470
T4
D82
TR33 BU2508DF
C100 220µ
FE
HOR DRIVE
R130 150
TR31 VN2010L
C72 1n
R93 8K2
D71 10V
R96 470
T3
HOR DEFL
P22-1
210
C83 6n8
C102 6n8
C103 18n
D84
L8
C104 300n
C105 560n
L3
C106 1n
R131 330
P22-4
211
P22-3
215
P22-5
214
D90
13VTV
D91
P16-1 H138
7VTV
C120 470µ
C121 470µ
P16-2 H139
13VTV
P16-3 H140
P14-3 C76
FILAMENT
P18-6 H133
VERT GND
R110 1M5
R111 2M7
R112 330K
C92 220p
D77
C90 2n2
R115 1K8
15V
R108 1K
R113 56K
R109 3K9
R119 33K
R120 2K2
TR35 IRF624
TR34 BC547B
R116 10K
D76
R117 2K2
R118 820
C91 4n7
R127 0R22
R114 47K
1/2IC5 LM358N
E/W DRIVE
H131 E/W DRIVE
P18-4
C129 4n7
HOR FLYBACK
H141
P16-5
D93
D100
C134 470µ
C135 220n
D109
C130 1µ
R147 1K
VERT FLY B
H137
H142
P18-10
P16-4
P22-7
212
R144 2M15
VERT DRIVE
FLYBACK GENERATOR
POWER AMP
THERMAL PROTECTION
IC4 TDA8172
VERT DEFL
C136 220n
R146 1R5
R141 3K3
R140 33K
C138 100p
C137 22µ
R143 1K8
R145 1K8
R142 0R47
C131 470µ
C133 220n
-10V
CHANGED IN MX7000
8VSB
D38 10V
R60 100
R59 1K
IC1
CNY 17-2 FEEDBACK
IC2
CNY 17-2 SYNC
IC3
CNY 17F2ZW 50/60Hz TIMER
R50 56K
R58 1K
C50 1n
R65 1K5
D40
13VTV
R66 220
R67 10K
R68 464
R64 499
R70 348K
TR16 BC557B
R62 1K
TR17 BC547B
C58 33p
R63 1K8
D41
D42 6V2
R71 14K7
R72 2K2
R47 470
TR14 BC547B
R49 56K
R76 680K
R78 1K
TR20 IRF624
D37
D50 10V
R79 180
R77 33K
R80 1K2
D52 6V2
D51
TR19 BC547B
R83 180K
TR18 BC547B
R82 22K
R85 330
R84 10K
R69 390
R81 10K
C61 2µ2
C62 100n
R86 680
TV MODE
SCL2
SDA2
POWER FAIL
50/60Hz TIMER
P13-3
G162
P13-4
P18-3
G146
G130
P12-3
P15-6
A17
D122
P12-2
P15-7
A16
D123
P13-2
G144
P11-1
A11
VERT DRIVE
P18-5
H132
VERT DEFL
P22-6
213
SELECT VOLTAGE WITH SHORTCUT CLAMP
1/2IC5 LM358N PROTECT
1/2 L8
HOR DRIVE
E/W DRIVE
VERT DRIVE
FLYBACK GENERATOR
POWER AMP
THERMAL PROTECTION
IC4 TDA8172
CHANGED IN MX7000

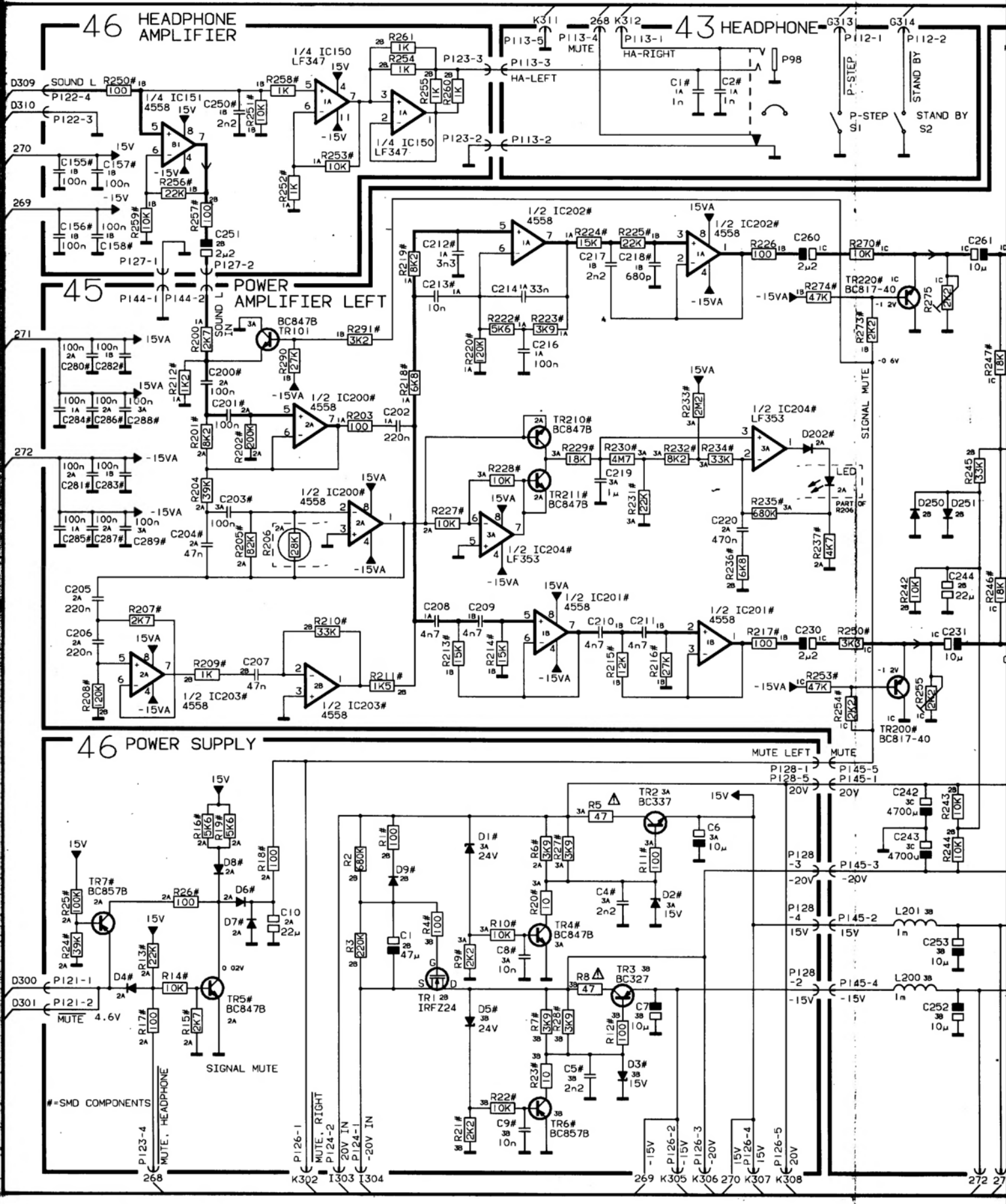
DIAGRAM K POWER AMPLIFER RIGHT



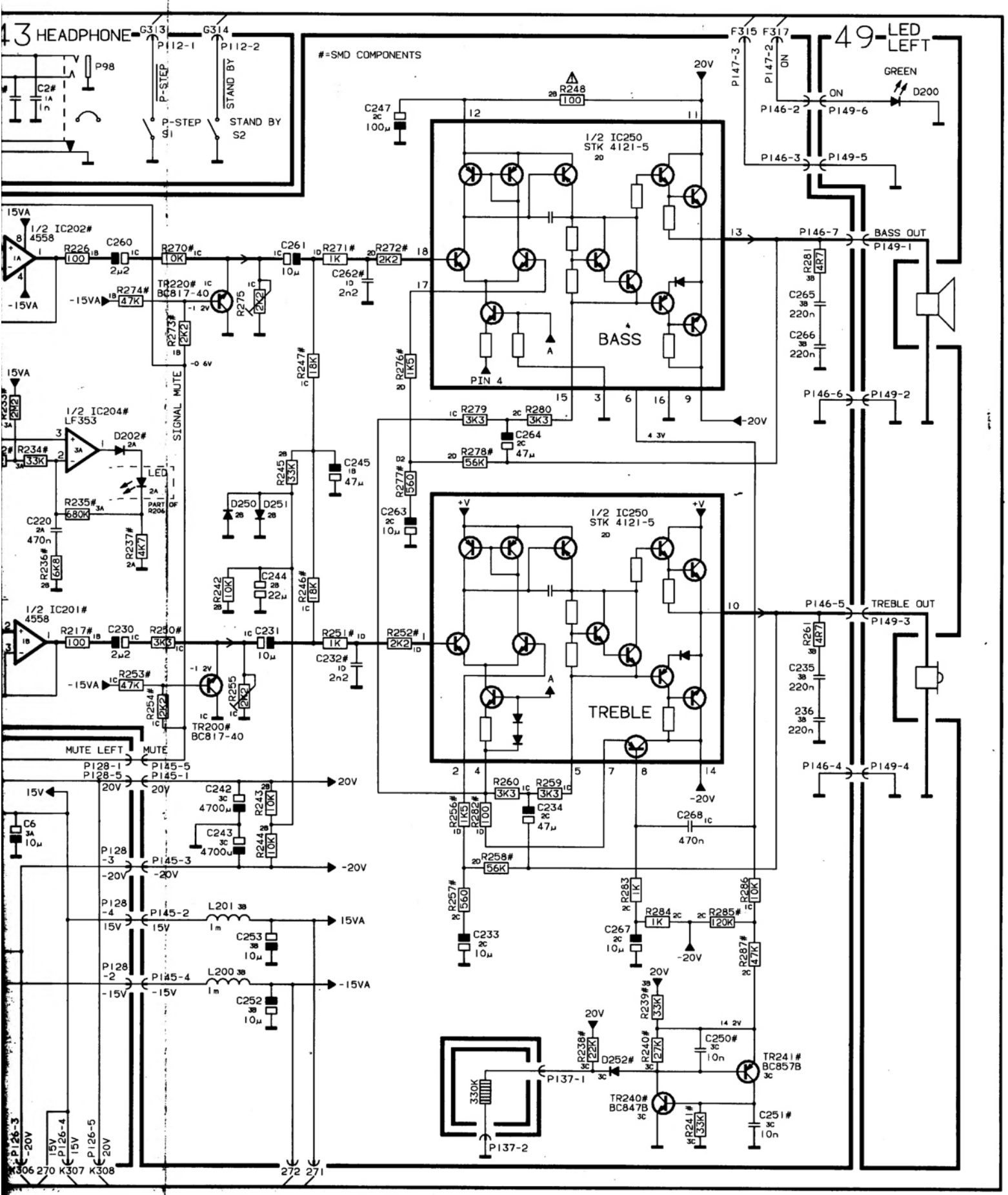
9-7
DIAGRAM K


42-LED RIGHT
GREEN
D100
ON
P148-6
P142-3
P148-5
F320
F322
P143-3
P143-2
1/2 IC150
STK 4121-5
BASS
TREBLE
PIN 4
P142-7
BASS OUT
P148-1
P142-6
P148-2
P142-5
TREBLE OUT
P148-3
P142-4
P148-4
1/2 IC102
4558
1/2 IC104
LF353
1/2 IC101
4558
SIGNAL MUTE
LED
PART OF R106
TR120# BC817-40
TR100# BC817-40
TR141# BC857B
TR140# BC847B
D102#
D150
D151
D152#
L101
L100
P138-1
P138-2
330K
20V
-20V
15VA
-15VA
P141-5
MUTE RIGHT
P141-1
20V
P141-3
-20V
P141-2
15V
P141-4
-15V
15VA
-15VA
L302
L308
L306
L305
L307
275
276

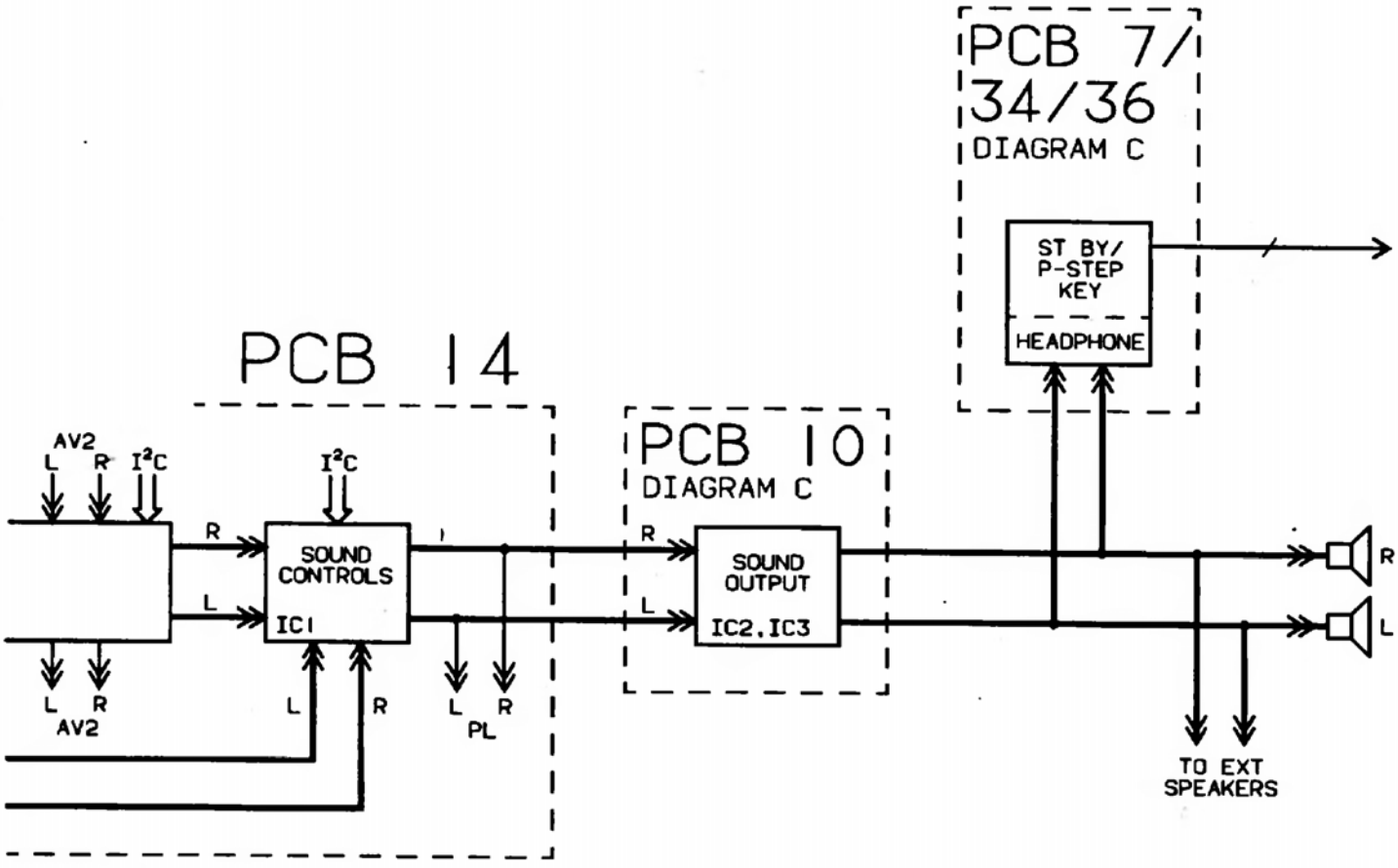
AGRAM L POWER AMPLIFER LEFT

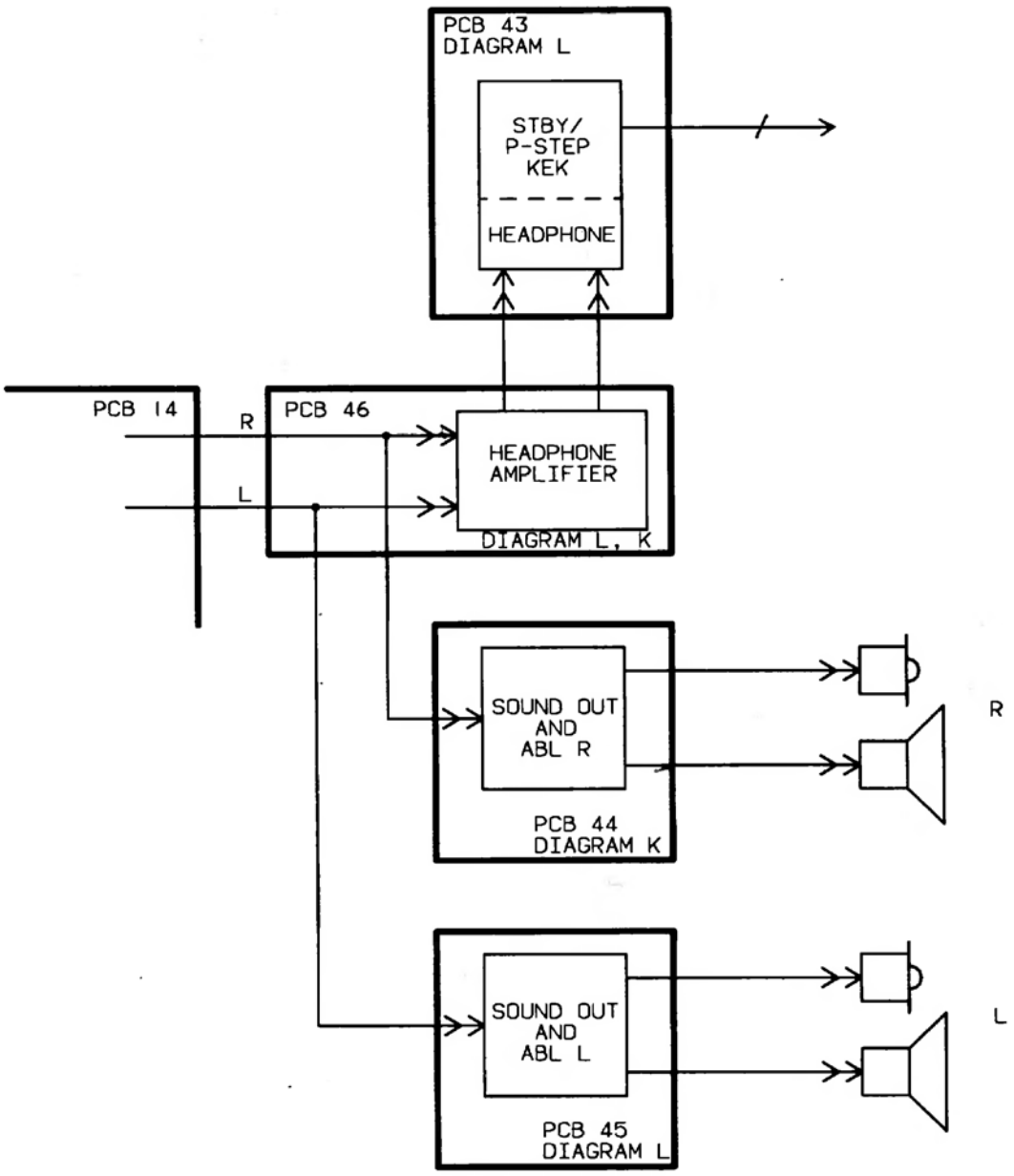


9-8
DIAGRAM L


13 HEADPHONE
G313
G314
P112-1
P112-2
P-STEP
STAND BY
P98
S1
S2
#=SMD COMPONENTS
49 LED LEFT
F315
F317
P147-3
P147-2
ON
GREEN
D200
P146-2
P149-6
P146-3
P149-5
20V
-20V
15VA
-15VA
1/2 IC250
STK 4121-5
BASS
TREBLE
PIN 4
1/2 IC202#
4558
1/2 IC204#
LF353
1/2 IC201#
4558
SIGNAL MUTE
MUTE LEFT
MUTE
P146-7
BASS OUT
P149-1
P146-6
P149-2
P146-5
TREBLE OUT
P149-3
P146-4
P149-4
TR220# BC817-40
TR200# BC817-40
TR240# BC847B
TR241# BC857B
D202#
LED
D250
D251
D252#
L201
L200
P137-1
P137-2
330K
P126-3
P126-4
P126-5
K306
K307
K308
270
272
271

PART OF PAGE 2-3




PCB 43
DIAGRAM L
STBY/
P-STEP
KEK
HEADPHONE
PCB 14
R
L
PCB 46
HEADPHONE
AMPLIFIER
DIAGRAM L, K
SOUND OUT
AND
ABL R
PCB 44
DIAGRAM K
R
SOUND OUT
AND
ABL L
PCB 45
DIAGRAM L
L

ADJUSTMENT

Adjustment of bass/treble levels

When a speaker is replaced, the level has to be adjusted.
The new unit will have a rated value printed on the back, stated in dB.

This is the target value of the adjustment.

The speaker units need not be connected when the adjustment is performed.

1. Connect an audio oscillator to the AUDIO AUX LINK socket:

   - right channel, pin 5.
   - left channel, pin 3.
   - ground, pin 2.

Signal levels

When adjusting a tweeter, apply a signal of 10kHz – 500mV.

When adjusting a woofer, apply a signal of 1kHz – 500mV.

2. The TV must be switched on during the adjustment, and the following settings must be used:

Volume	**60**
Bass	**0**
Treble	**0**
Balance	**0**
Loudness	**0**

NOTE!
If this audio setup is not stored, it has to be repeated in case the TV is switched on after having been switched off during the adjustment procedure.

3. To obtain an input signal from the AUDIO AUX LINK socket, press [AV] [RADIO].

4. Connect a AC voltmeter across the connection terminals of the replaced unit.
   Adjust by means of:

Tweeter

right channel: R155-PCB44
left channel: R255-PCB45

Woofer

right channel: R175-PCB44
left channel: R275-PCB45

to the voltage in Table 1 that corresponds to the rated value.

Replacement of PCB44

When PCB44 is replaced, the level of the tweeter has to be adjusted to 2,39V by means of R155-PCB44 and that of the woofer to 2,04V by means of R175-PCB44.

Replacement of PCB45

When PCB45 is replaced, the level of the tweeter has to be adjusted to 2,39V by means of R255-PCB45 and that of the woofer to 2,04V by means of R275-PCB45.

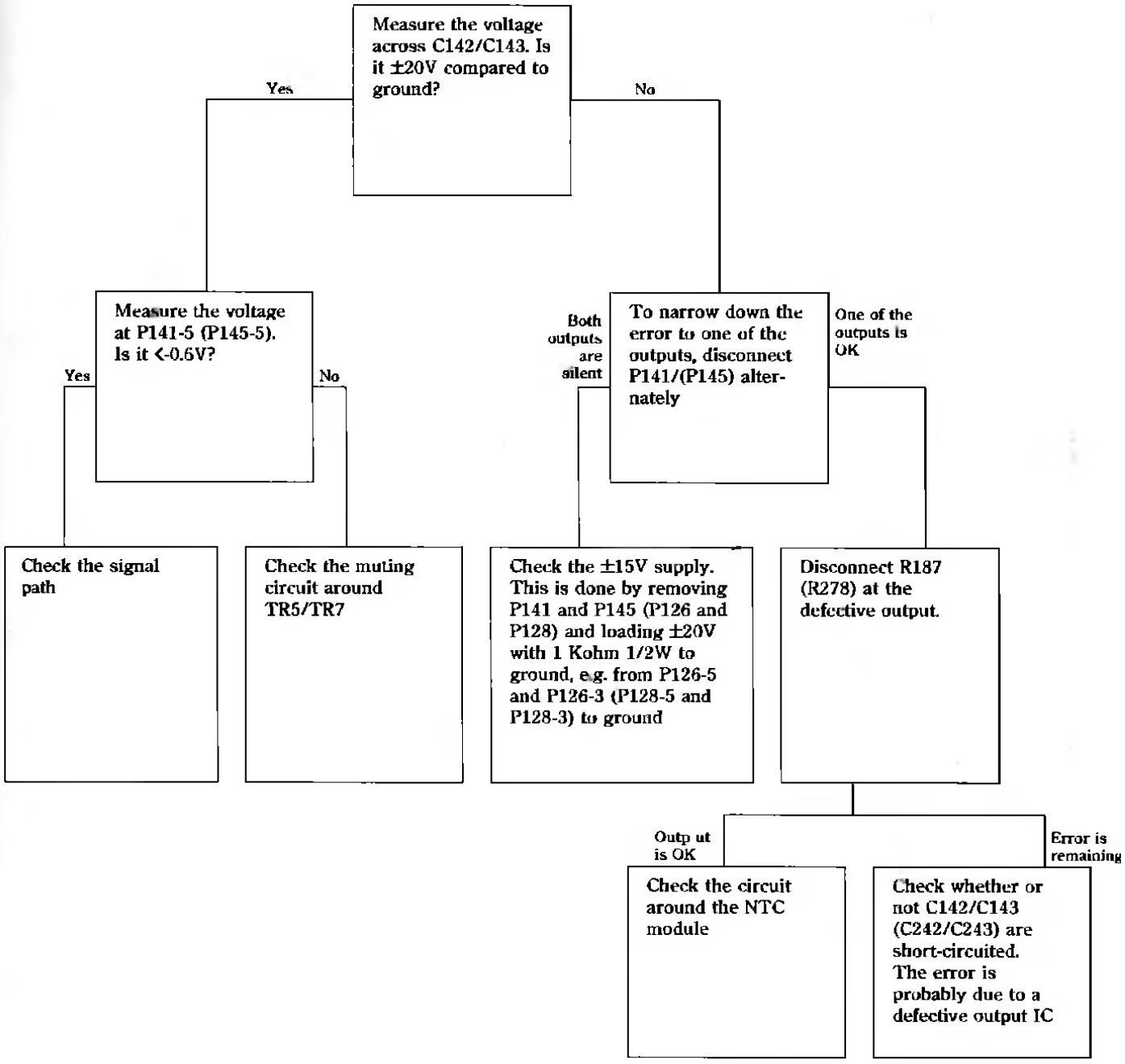
Rated value in dB	Treble	Bass
2,00	1,90V	1,62V
1,75	1,96V	1,67V
1,50	2,01V	1,72V
1,25	2,07V	1,77V
1,00	2,13V	1,82V
0,75	2,19V	1,88V
0,50	2,26V	1,93V
0,25	2,32V	1,98V
0,00	2,39V	2,04V
–0,25	2,46V	2,10V
–0,50	2,53V	2,17V
–0,75	2,61V	2,23V
–1,00	2,68V	2,29V
–1,25	2,76V	2,36V
–1,50	2,84V	2,43V
-1,75	2,93V	2,50V
–2,00	3,01V	2,57V

Tabel 1

Repair tips

If both outputs are silent, this will often be due to an uneven loading of the ±20V supply.
The chart below can be used to pinpoint the reason for the error.

Position numbers in brackets apply to the left channel.


Measure the voltage across C142/C143. Is it ±20V compared to ground?
Yes
No
Measure the voltage at P141-5 (P145-5). Is it <-0.6V?
Yes
No
Both outputs are silent
To narrow down the error to one of the outputs, disconnect P141/(P145) alternately
One of the outputs is OK
Check the signal path
Check the muting circuit around TR5/TR7
Check the ±15V supply. This is done by removing P141 and P145 (P126 and P128) and loading ±20V with 1 Kohm 1/2W to ground, e.g. from P126-5 and P126-3 (P128-5 and P128-3) to ground
Disconnect R187 (R278) at the defective output.
Outp ut is OK
Error is remaining
Check the circuit around the NTC module
Check whether or not C142/C143 (C242/C243) are short-circuited. The error is probably due to a defective output IC

The ABL function is checked most easily by connecting an audio oscillator (80 Hz) to the AUDIO AUX LINK socket.

The following settings must be used during the testing procedure:

Volume	**80**
Bass	**0**
Treble	**0**
Balance	**0**
Loudness	**0**

NOTE!
If this audio setup is not stored, it has to be repeated in case the TV is switched on after having been switched off during the adjustment procedure.

To obtain an input signal from the AUDIO AUX LINK socket, press [AV] [RADIO].

Connect a DC voltmeter across R137-PCB44 (R237-PCB45).

Set the audio oscillator level to approx. 70mV, and then increase it slowly until the voltage across R137-PCB44 (R237-PCB45) just begins to increase from 0V. The voltage must be between 0 and 30mV. In this condition the ABL will just be active.

Then increase the level at the input by 10dB.

The voltage across R137-PCB44 (R237-PCB45) must increase to approx. 2.6V immediately.

Damp the level at the input by 10dB.

After 5 to 10 seconds, the voltage across R137-PCB44 (R237-PCB45) must drop to approx. 0V. The ABL is now out of operation.

EINSTELLUNG

Einstellung des Tie pegels

Signalpegel